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Vehicular Instrumentation into the 21st Century

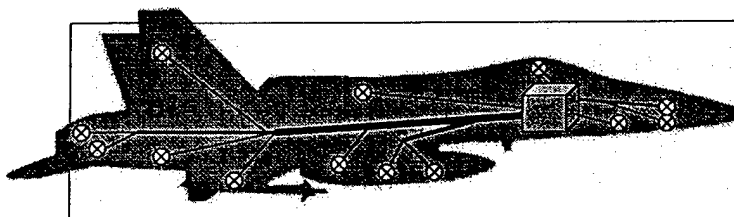
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16 Jun 99

NexGenBus

Instrumentation System Topologies Centralized Data Systems



⊗ n Transducers/Avionics taps

≡ Varying sizes of wire bundles

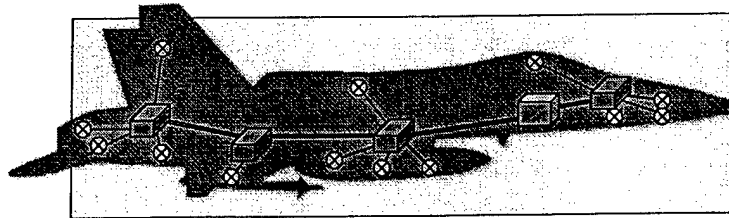


Instrumentation System Unit

Interface to data signals
Formatted data output to:
Recorders, Transmitters, Etc

Instrumentation System Topologies


Distributed Data Systems




⊗ n Transducers/Avionics taps

≡ Varying sizes of wire bundles

— Communications Bus

 Instrumentation Control Unit
Formatted data output to:
Recorders, Transmitters, Etc

 Transducer Interface Units
Interface data signals onto the bus at the
request of the control unit

Current System Limitations

- Unable to meet data rate requirements
- Aging technology
- Closed architecture
- Network incompatibilities

DoD Policy Trends

- Acquisition Reform
- Decreasing budgets
- Shorter cycle times
- Open architecture and COTS

Commercial Technology Trends

- Growth of the Internet
- Proliferation of PC and LAN technology
 - Price/performance ratios are plummeting
- Data packets are the universal data structure

Future Instr. Systems Must:

- Have open architecture
- Utilize COTS hardware/software
- Easily interface with global network infrastructure
- Leverage commercial standards
- Meet exponential growth in data requirements
- Easily incorporate leading edge technology

Data Acquisition Networks

- Network based instrumentation system
- Data is formatted and moved in packets
- Compatible with network infrastructure
- Open architecture based on Commercial standards

Leading the Way

- Next Generation Instrumentation Bus
 - Vehicular Data Acquisition Network
 - High Speed
 - Comforms to OSI Communications Model to facilitate technology insertion
- Air Force SBIR AF99-302
 - Fibre Channel bridge to legacy instrumentation standards
 - Demonstrate CAIS to Fibre Channel bridge

The Challenges

- Non-standard packet structures
- Leading industry
- Bandwidth concerns (RF and recorder)

Bandwidth Concerns

- RF Bandwidth
 - Reduced RF spectrum available
 - Data requirements keep increasing
- Recorder Bandwidth
 - NexGenBus will have a data rate of 800 Mbps
 - Large recorders are currently at 240 / 107 Mbps
 - Smaller formats are trying to achieve 32 Mbps

Conclusion

- Data acquisition networks are coming
- Challenges are being addressed
- A new era in instrumentation affordability, capability, and complexity will be born.